CLAIM AMENDMENTS

Please amend the claims as follows:

1. (Currently Amended) A method of monitoring at least one unknown [[a]] neutron source, the method comprising:

i) providing a plurality of neutron detectors at known positions relative to one another;

ii) monitoring [[the]] actual neutron detection rates for the neutron detectors caused by the at least one unknown neuton source[[(s)]];

iii) proposing [[a]] at least one model source, the at least one model source having a location[[(s)]] relative to the neutron detectors and an activity level ~~for the model source(s)~~;

iv) predicting neutron detection rates for the at least one model source[[(s)]];

v) comparing the predicted and actual neutron detection rates;

vi) adjusting at least one of the following: the location of the at least one model source ~~location(s) and/or activity(s)~~, the activity level for the at least one model source, and the location and activity level for the at least one model source to reduce the difference between the predicted and actual neutron detection rates.

2. (Currently Amended) A method according to claim 1 in which the predicted neutron detection rates are obtained for at least one trial solution and a plurality of sources are employed in the at least one first trial solution.

3. (Original) A method according to claim 2 in which the number of sources is reduced in further trial solutions if the model to actual comparison is minimised, and would not be increased beyond a certain tolerance if one of the sources were removed.

4. (Currently Amended) A method according to claim 1 [[2]] in which the predicted neutron detection rate for [[a]] one of the plurality of neutron detectors is determined from stored calibration data.

5. (Currently Amended) A method according to claim 4 in which the calibration data is obtained by determining the actual ~~count~~ detection rates for a single one of the plurality of neutron detectors with varying source locations ~~and/or activities~~.

6. (Currently Amended) A method according to claim 5 in which the calibration data is obtained for the neutron detectors in their ~~relative~~ positions of use relative to one another ~~of use~~.

7. (Currently Amended) A method according to claim 5 in which the ~~calibration data is obtained~~ at least one unknown neutron source is monitored with the neutron detectors positioned relative to[[the]] a volume or item ~~to be monitored~~ and the calibration data is obtained with the neutron detectors positioned relative to a [[dummy]] replica ~~version~~ of the volume or item ~~to be measured around an equivalent volume of free space~~.

8. (Previously Presented) A method according to claim 4 in which the calibration data is extrapolated from a number of calibration tests to provide a set of detection efficiency contour information.

9. (Currently Amended) A method according to claim 1 in which the predicted ~~count rates~~ and actual [[count]] neutron detection rates ~~may be~~ are compared by summing the difference between the two sets of values.

10. (Currently Amended) A method according to claim 9 in which the sum of the squares of the differences is employed as the comparison between the actual and [[model]] predicted [[count]] neutron detection rates.

11. (Currently Amended) A method according to claim 1 in which a revised [[trial]] model source ~~location and/or activity~~ is provided unless the comparison meets a certain desired limit.

12. (Currently Amended) A method according to claim 11 in which the revised [[trial]] model source ~~location and/or activity~~ is selected by:

determining a comparative function for the actual and ~~model results~~ predicted neutron detection rates;

determining the effect of [[slight]] a variation[[s]] in the at least one model ~~solution~~ source; and

adjusting a subsequent [[the]] model source used next ~~model solution values~~ according to [[the]] one of the following: a directional effect and[[/or]] a magnitude effect suggested by the [[slight]] variation.

13. (Currently Amended) A method according to claim 12 in which [[the]] determining the comparative ~~process~~ function and determining the ~~slight~~ effect of the variation ~~effect is~~ are determined separately for each dimensional variable for the model source locations and each activity variable for the model source locations.

14. (Original) A method according to claim 13 in which the individual variation effects are combined to give the variation between one model solution and the next.

15. (Currently Amended) A method according to claim 1 in which the at least one model source comprises a plurality of model sources, including a specified model ~~solution~~ source that is compared with [[the]] a previous model ~~solution~~ source, and if the specified model ~~solution~~ source represents a poorer fit than the previous ~~solution~~ model source a revised model ~~solution~~ source is applied, the revised model ~~solution~~ source comprising a ~~solution~~ model source intermediate in one or more values to the specified model ~~solution~~ source and the previous model ~~solution~~ source.

16. (Currently Amended) A method according to claim 1 in which once ~~the adjustment of~~ adjusting the [[trial]] at least one model source ~~location and/or activity~~ has been stopped, a proposal for the ~~actual source~~ location and the activity level of the at least one unknown neutron source is provided.

17. (Currently Amended) A method according to claim 16 in which the location is expressed in terms of a coordinate system ~~and/or in terms of a distance and angle(s) from a fixed point~~.

18. (Cancelled)

19. (Currently Amended) An apparatus for monitoring at least one unknown [[a]] neutron source, comprising:-

i) a plurality of neutron detectors at known positions relative to one another;

ii) processing means for monitoring the neutron detection rates for the detectors caused by the at least one unknown neuton source[[(s)]];

iii) data storage means containing predicted neutron detection rates for the neutron detectors for varying source locations and source activity levels; and

wherein the actual neutron detection rates are compared with the predicted neutron detection rates for [[a]] at least one model source ~~source locations and activity level;~~ and wherein the at least one model source is adjusted in terms of at least one of the following: model source location, model source activity level, and both model source location and model source activity level ~~and/or activity is adjusted~~ to reduce the difference between the predicted and actual neutron detection rates.

20. (Currently Amended) A method according to claim 19 in which the neutron detectors are provided along at least two sides ~~of the volume~~ and a [[the]] top and a bottom of a volume containing the at least one unknown neutron source.

21. (Currently Amended) A method according to claim 19 in which a plurality of the neutron detectors are horizontally and vertically separated from one another.

22. (Currently Amended) A method according to claim 19 in which the relative positions of the neutron detectors to one another ~~and/or relative to the source~~ are considered in at least two [[2]] dimensions ~~or in 3 dimensions~~ using a ~~co-ordinate~~ coordinate system ~~or in terms of a distance and angle(s) system~~.

23. (Currently Amended) A method according to claim [[32]] 22 in which the coordinate system ~~or angle system~~ is defined about one of: a fixed point corresponding to one of the detectors, and [[or to]] a fixed point on [[the]] an item to be monitored.

24. (Currently Amended) A method according to claim 22 in which at least one axis of the coordinate system ~~one or more of the axis~~ is defined to correspond to at least one ~~or more of the~~ edge[[s]] of [[the]] an item to be monitored.

25. (Currently Amended) A method according to claim [[22]] 19 in which ~~the angle system~~ the relative positions of the neutron detectors to one another are considered in at least two dimensions in terms of a distance and angle system, wherein at least one ~~or more of the~~ edge[[s]] of an [[the]] item to be monitored forms an ~~forms the~~ axis relative to which at least one angle is ~~the angle or angels are~~ determined.

26. (Cancelled)

27. (Currently Amended) A method according to claim 19 in which at least one of the neutron ~~one or more~~ detectors ~~and/or pairs of detectors are~~ is provided with a restricted field of view from which neutrons can be detected, the field of view being restricted by neutron shielding material.

28. (Currently Amended) A method according to claim 27 in which the field of view for neutron detection for ~~one or more of~~ the at least one neutron detector~~s or pairs of detectors~~ is restricted to an arc, about the individual axis of the at least one neutron detector[[s]], of between 10 and 150 degrees.

29. (Currently Amended) A method according to claim 27 in which at least one ~~or more~~ of the neutron detectors ~~and/or pairs of detectors~~ near to the corners of the volume to be monitored [[are]] is provided with a greater field of view than [[the]] other of the neutron detectors.

30. (New) A method according to claim 4 in which the calibration data is obtained by determining the actual neutron detection rates for a single one of the neutron detectors with varying source activities.

31. (New) A method according to claim 16 in which the location is expressed in terms of a distance and at least one angle from a fixed point.

32. (New) A method according to claim 19 in which the relative positions of the neutron detectors to one another are considered in at least two dimensions in terms of a distance and at least one angle.